



CHAIRMAN OF THE JOINT CHIEFS OF STAFF INSTRUCTION

J-6

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CJCSI 3220.01

30 June 1997

ELECTROMAGNETIC SPECTRUM USE IN JOINT MILITARY OPERATIONS

References: Enclosure B

1. Purpose. To issue policy and guidance for planning, coordinating, and controlling electromagnetic spectrum use in joint military operations. References in Enclosure B are provided for further reading.
2. Cancellation. None.
3. Applicability. This instruction applies to the Joint Staff, Services, unified commands, US elements of combined commands, Defense agencies, and joint activities. Refer to Reference 1 for detailed operations and planning guidance.
4. Policy. Assured access to the electromagnetic spectrum is vital to DOD operations worldwide. This publication identifies the basic considerations for operating communications equipment in military environments.
5. Definitions. See Glossary.
6. Responsibilities. See Enclosure A.
7. Effective Date. This instruction is effective upon receipt.
8. Joint Spectrum Environment. Military operations rely heavily on equipment using the limited resources of the electromagnetic spectrum; in joint military operations the requirements will certainly exceed the amount of spectrum available. Thus, the efficient use and control of the spectrum is critical to the national security in terms of information operations (IO) and combat operations in terms of command and control warfare (C2W). Effective spectrum management (the organized control and use of the

electromagnetic spectrum) is a basic building block of Defensive IO and C2 Protect to ensure that necessary operations can be conducted with minimal unintentional interference (fratricide) and without electromagnetic environmental effects (E3) hazards to ordnance. The rapid growth of sophisticated weapons systems, as well as intelligence, operations, and communications systems, will increase demand for frequencies that, if not coordinated and carefully preplanned, will have an adverse effect upon friendly but competing users. Another major constraint on the spectrum is that transmission approval for any portion of the spectrum is a carefully protected right of sovereign governments. Joint and combined force operations also must consider the needs of coalition forces in future contingencies. Therefore, an effective spectrum management structure is required not only to satisfy the spectrum needs of military users, but also to coordinate with host nations to facilitate effective use of this finite resource. Further spectrum issues are discussed within the references in Enclosure B.

9. Electromagnetic Spectrum Planning, Coordination, and Control. To use the spectrum successfully, all users must work together by exchanging spectrum-use information from the beginning of the joint planning process through the execution of any operation. Primarily, personnel in the operations (J-3), intelligence (J-2), and communications (J-6) functional areas plan, coordinate, and control joint military use of the electromagnetic spectrum. To minimize unacceptable electromagnetic interference (EMI) among all emitters and receivers and to prevent E3 problems to ordnance in joint operations, these three functional areas must work together. Automated spectrum management systems at the joint and component levels should be vertically and horizontally interoperable.

10. Concept of Control. The supported joint force commander holds the authority for assigning frequencies to users, usually through the Joint Frequency Management Office (JFMO). The JFMO normally will further delegate frequency assignment authority to subordinate commands. Authority to assign use of a specific spectrum resource should be delegated to the lowest level of command possible, consistent with the principles of sound spectrum management, spectrum use considerations, concept of operations, and priority of mission functions detailed in the respective Service or joint publications. Subordinate commands delegated authority for approving spectrum use will make frequency assignments within the constraints imposed by higher authorities and report changes in spectrum-use information to the JFMO.

11. Spectrum-Use Conflicts. To ensure critical frequencies and C2 nodes are protected from unintentional interference due to friendly operations, the J-6 coordinates, publishes, and distributes a Joint Restricted Frequency List (JRFL) based on inputs from the J-2, J-3, and J-6. The J-3 must approve the coordinated JRFL prior to its release. This is normally accomplished as part of the Joint Commander's Electronic Warfare Staff (JCEWS) function, or the C2W Cell, or IO Cell. As new requirements are identified, situations of conflicting or competing use of the spectrum will occur. Conflicts within a primary functional area are resolved at the lowest

possible level or by the JFMO. For conflicting or competing use that affects more than one primary functional area, the JCEWS examines requirements and attempts to resolve the problem in coordination with the JFMO. If resolution is impossible at this level, the matter is elevated to the joint force commander or designee, usually the J-3.

12. Joint Spectrum-Use Planning. Planning for use of the spectrum resource and assigning of spectrum management responsibilities must be fully integrated into the Joint Operation Planning and Execution System (JOPES) process. The complexity of effective joint spectrum use and management requires advance planning for scenarios of expected military operations. Each joint and subordinate component command must establish planning procedures to address all spectrum-dependent equipment used in support of an OPLAN and any other requirements of friendly forces that impact the use of the electromagnetic spectrum. Spectrum managers must be fully integrated into the planning process at the earliest stages. Additionally, planning must be done in a consistent manner with each joint command expected to be supported. Without advance spectrum-use planning, EMI among users and/or a shortage of assignable frequencies may become a severe limitation to rapid deployment and employment of forces.

For the Chairman of the Joint Chiefs of Staff:

\Signature\
DENNIS C. BLAIR
Vice Admiral, U.S. Navy
Director, Joint Staff

Enclosures:
A--Responsibilities
B--References
Glossary

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ENCLOSURE A
RESPONSIBILITIES

1. The Chairman of the Joint Chiefs of Staff will:
 - a. Provide policy oversight on development of a joint standard for exchange of spectrum-use data.
 - b. Identify, assess, and recommend measures to ensure that electromagnetic spectrum use is mutually supporting and effective in joint and combined operations.
2. CINCs with Geographic Areas of Responsibility (AORs) will:
 - a. Establish command-specific policy and guidance for electromagnetic spectrum use situations that uniquely apply to their area.
 - b. Establish a standing frequency management structure, to include a JFMO, and procedures to support planned and ongoing operations. Specific actions will be taken to:
 - (1) Ensure OPLANs and communications plans (COMPLANs) address coordination among forces using spectrum to enable effective exchange of information, eliminate duplication of effort, and achieve mutual support.
 - (2) Ensure plans address any necessary augmentation of the JFMO to support the effort.
 - (3) Resolve user conflicts not resolved at a lower level.
 - (4) Maintain close contact with appropriate foreign military forces to ensure that mutual spectrum support is considered in combined planning, operations, training, and exercises.
 - c. Function as controlling authority for the Joint Communications-Electronics Operation Instructions
 - d. The CINC J-6 (JFMO) will:
 - (1) Develop and distribute spectrum-use plans for particular frequency bands, as appropriate.
 - (2) Participate in the JCEWS, C2W Cell, and/or IO Cell. Prepare the JRFL input for communications support systems. Combine J-2, J-3, and J-6 inputs to develop a proposed JRFL for approval by the CINC J-3.

- (3) Periodically update and distribute the JRFL.
- (4) Provide administrative and technical support for military spectrum use.
- (5) Exercise or delegate frequency assignment authority.
- (6) Maintain the common data base necessary for planning, coordinating, and controlling spectrum use. This data base contains spectrum-use information on all friendly military and civilian, available enemy, and neutral emitters and receivers, appropriate for the AOR involved.
- (7) Analyze and evaluate potential spectrum-use conflicts.
- (8) Assist and coordinate the resolution of spectrum-use conflicts as a member of the JCEWS, C2W, and/or IO Cell.
- (9) In accordance with CINC J-5 guidance, coordinate military spectrum use with the spectrum authority of the host nation(s) involved, in coordination with the US Embassy DATT when appropriate.
- (10) Be the focal point for inclusion of spectrum-use considerations in the JOPES.
- (11) Receive reports, analyze, attempt to resolve incidents of unacceptable EMI, act as the focal point for requesting interference resolution support from the Joint Spectrum Center (JSC) and provide guidance for resolving radio frequency interference problems at the lowest level in the chain of command, in accordance with reference k. Report all EMI incidents that cannot be resolved to the JSC for resolution as described in reference k, Enclosure A, paragraph 3. All electronic attack and persistent, recurring radio frequency interference problems will be reported to the JSC in a timely manner to support resolution of interference problems, trend analysis, development of lessons learned, and inputs to the DOD Indications and Warning System.
- (12) Participate in the joint C2W Cell to ensure that the spectrum architecture supports the Joint Staff's C2W plans and that the use of the spectrum is coordinated among the five C2W elements.
- (13) Support operations as a member of the JCEWS, C2W Cell, or IO Cell.

e. The CINC J-3 will:

- (1) Establish the JCEWS, C2W Cell, or IO Cell in accordance with (IAW) reference p and C2W Cell IAW reference o.
- (2) Provide spectrum-use considerations to CINC J-6 for inclusion in the JOPES.
- (3) Resolve internal spectrum-use conflicts (J-3 systems) which the JFMO or JCEWS, C2W Cell, and/or IO Cell are unable to resolve.
- (4) Provide the concept of operation.
- (5) Establish the priority of mission functions.
- (6) Identify and resolve potential E3 hazards to ordnance. Act as the focal point for requesting ordnance assist team support from the JSC.

f. The CINC J-2 will:

- (1) Participate in the JCEWS, C2W Cell, and/or IO Cell, and assess and provide CINC J-6 with prioritized spectrum-use requirements that support intelligence operations.
- (2) Resolve internal spectrum-use conflicts (J-2 systems).
- (3) Participate in multifunctional user, spectrum-use conflict resolution.
- (4) Provide JRFL input to JFMO.
- (5) Provide, in coordination with the Director, National Security Agency, the national SIGINT authority and make available actual enemy spectrum-use data in accordance with data release constraints.
- (6) Include spectrum-use considerations in the JOPES.
- (7) Assist CINC J-6 in determining the sources of any unacceptable EMI or other persistent and recurring interference.

g. The CINC J-5 will establish channels for the negotiation of military use of the spectrum with any nation involved in a joint or combined military operation, or within whose territory US forces may be operating where procedures do not already exist.

3. The Joint Task Force (JTF) Commander will:
 - a. For operations within a CINC AOR, follow electromagnetic spectrum use policy and guidance established by the CINC.
 - b. Work with the CINC staff if modifications are necessary for a specific electromagnetic spectrum use situation.
 - c. For operations outside a CINC AOR, assume the responsibilities listed for the CINC in paragraph 2 of this enclosure.
 - d. Coordinate with the supporting CINCs to determine what functions their staffs must undertake to control use of the electromagnetic spectrum and what outside support is available.
4. The Services will:
 - a. Ensure that personnel assigned to the CINC and JTF frequency management billets are properly trained and have adequate security clearances to operate in the joint environment.
 - b. Equip and train frequency management personnel to operate the DOD-wide standard spectrum management information system to plan, coordinate, and control electromagnetic spectrum use at the Service, CINC JFMO, and JTF levels.
5. Defense Agencies and Other Joint Activities will:
 - a. Establish internal policy and procedures consistent with this instruction.
 - b. Include spectrum-use considerations in the JOPES.
6. The Director National Security Agency/Chief, Central Security Service, as principal SIGINT and information systems security (INFOSEC) adviser to the Secretary of Defense, Director of Central Intelligence, and the Chairman of the Joint Chiefs of Staff, is responsible for:
 - a. Executing the INFOSEC responsibilities of the Secretary of Defense in support of electromagnetic spectrum use.
 - b. Provide SIGINT support for spectrum-use efforts of CINCs and other commanders designated by the Chairman of the Joint Chiefs of Staff in accordance with their expressed formal requirements.

c. Within appropriate classification guidelines, provide target frequency data and JRFL input to JFMO to ensure maximum protection from friendly interference or EW against vital SIGINT targets.

7. The Director, DIA, is responsible for:

- a. Participating with the Joint Staff in the development and maintenance of a data base to support use of the electromagnetic spectrum in joint operations.
- b. Participating with the Joint Staff in developing and maintaining a minimum subset of data to be used by all functional areas in passing spectrum-use parameters.

8. The Commander, Joint Spectrum Center, under the operational direction of the Chairman of the Joint Chiefs of Staff (Joint Staff/J-6), will:

- a. Develop, maintain, and distribute electromagnetic compatibility (EMC) data, spectrum engineering tools, and EMC analysis models.
- b. Provide spectrum management, interference resolution, and E3 support, and direct support teams to CINC/JTF commanders.
- c. As requested, review E3 and spectrum management aspects of operational plans.
- d. Develop and manage a DOD-wide standard joint spectrum management system for planning, coordinating, and controlling electromagnetic spectrum use in joint military operations; assist the Services in ensuring full interoperability between the joint and Service spectrum management systems.

9. Spectrum Users will:

- a. Obtain frequency use authorization for each use of the electromagnetic spectrum through their appropriate joint force component.
- b. Use frequencies as assigned and operate systems according to parameters authorized by the frequency certification and assignment processes.
- c. Coordinate any need to exceed or operate outside the parameters authorized through the appropriate joint force component.
- d. Ensure the emitting equipment is properly maintained to preclude unintentional violation of authorized spectrum-use parameters.

- e. Report incidents of unacceptable EMI to the appropriate joint force component or to the joint force JFMO.

ENCLOSURE B

REFERENCES

- a. DODD 3222.3, 20 August 1990, "Department of Defense Electromagnetic Compatibility Program"
- b. DODD 4650.1, 24 June 1987, "Management and Use of the Radio Frequency Spectrum"
- c. DODI 5000.1, 23 February 1991, "Defense Acquisition"
- d. DODD 5000.2, 23 February 1991, "Defense Acquisition Management Policies and Procedures"
- e. DODD 5000.2M, 23 February 1991, "DOD Manual Defense Acquisition Management Documentation and Reports"
- f. DODD 5100.35, 6 May 1985, "Military Communications-Electronics Board"
- g. CJCSI 3210.03, 22 November 1996, "Joint Electronic Warfare Policy"
- h. CJCSI 3213.01, 28 May 1993, "Joint Operations Security"
- i. CJCSI 3220.01, June 1997, "Electromagnetic Spectrum Use in Joint Military Operations"
- j. CJCSI 3320.02, June 1997, "Joint Spectrum Interference Resolution (JSIR)"
- k. CJCSM 3220.01, July 1997, "Joint Operations in the Electromagnetic Battlespace"
- l. CJCS MOP 7, 30 January 1990, "Joint Strategic Planning System"
- m. CJCS MOP 54, 20 November 1990, "Joint and Combined Communications Security"
- n. Joint Pub 1-02, 23 March 1994, "Department of Defense Dictionary of Military and Associated Terms"
- o. Joint Pub 3-13.1, 7 February 1996, "Joint Doctrine for Command and Control Warfare"
- p. Joint Pub 3-51, June 1991, "Electronic Warfare in Joint Military Operations"
- q. MIL-STD-461D, 11 January 1993, "Electromagnetic Emission and Susceptibility Requirements for Control of Electromagnetic Interference"

r. MIL-E-6051D, 7 September 1967, "Electromagnetic Compatibility Requirements Systems"

GLOSSARY

electromagnetic spectrum. The range of frequencies of electromagnetic radiation from zero to infinity. (Joint Pub 1-02)

spectrum management. Planning, coordinating, and managing joint use of the electromagnetic spectrum through operational, engineering, and administrative procedures, with the objective of enabling electronic systems to perform their functions in the intended environment without causing or suffering unacceptable interference.

electromagnetic compatibility (EMC). The ability of systems, equipment, and devices that utilize the electromagnetic spectrum to operate in their intended operational environments without suffering unacceptable degradation, or causing unintentional degradation because of electromagnetic radiation or response. It involves the application of sound electromagnetic spectrum management, system, equipment, and device design configuration that ensures interference-free operation, and clear concepts and doctrines that maximize operational effectiveness.

electromagnetic environmental effects (E3). The impact of the electromagnetic environment upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including electromagnetic compatibility/interference; electromagnetic vulnerability; electromagnetic pulse; hazards of electromagnetic radiation to personnel, ordnance, and volatile materials; and natural phenomena effects of lightning and p-static.

electromagnetic interference (EMI). Any disturbance interrupting, obstructing, or otherwise degrading or limiting the effective performance of electronics or electrical equipment. It can be induced intentionally, as in EW, or unintentionally, through spurious emissions/responses, intermodulation products, or the like. (Joint Pub 1-02)

electronic warfare (EW). Any military action involving the use of electromagnetic energy or directed energy to control the electromagnetic spectrum or to attack the enemy. (Joint Pub 1-02)

frequency assignment. Authorization to use a specific frequency under specified conditions.

telecommunications. Any transmission, emission, or reception of signs, signals, writings, images, sounds, or information of any nature by wire, radio, visual, or other electromagnetic systems. (Joint Pub 1-02)

joint force commander. CINC or JTF commander designated to conduct an operation by NCA.

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